

Air Traffic Control Seminar

Current ATC Operations: Terminal Radar Approach Control

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Northern California TRACON

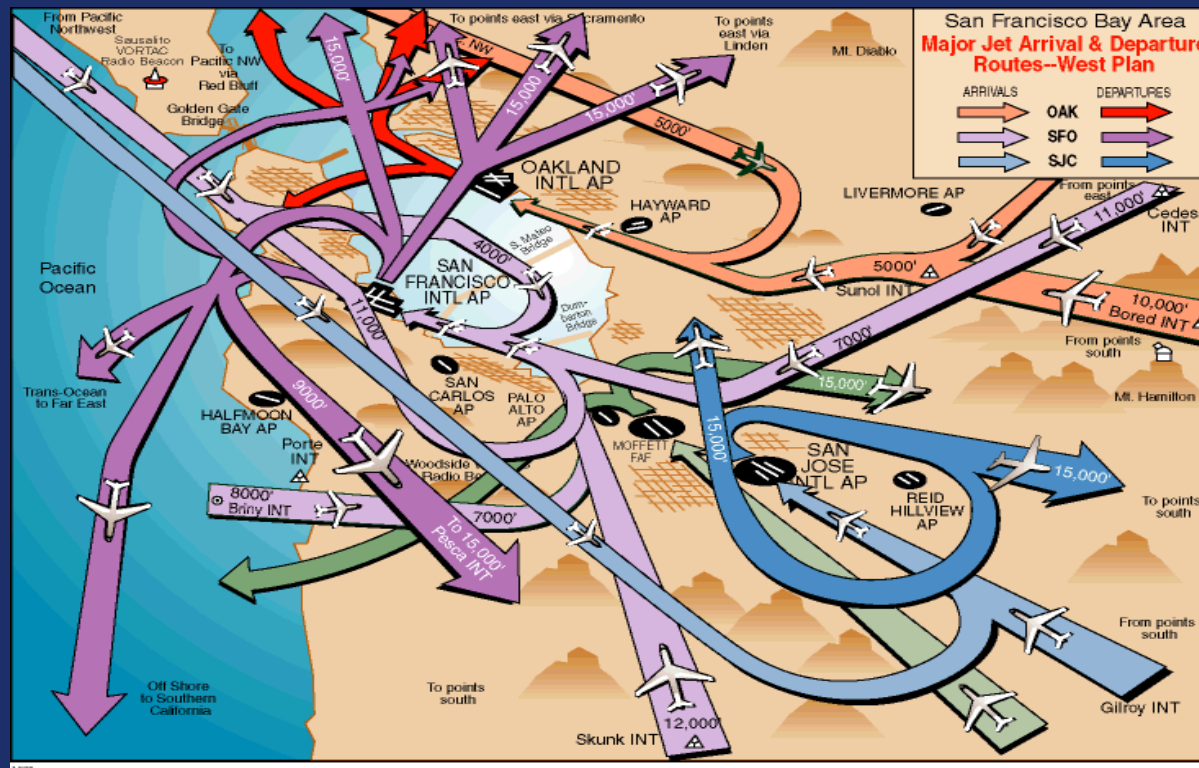
NASA Ames Research Center

Moffett Field, California

July 5-6, 2006



Terminal Radar Approach Control (TRACON)



The TRACON's main function is to separate arrivals from departures to and from the underlying airports (towered and non-towered)

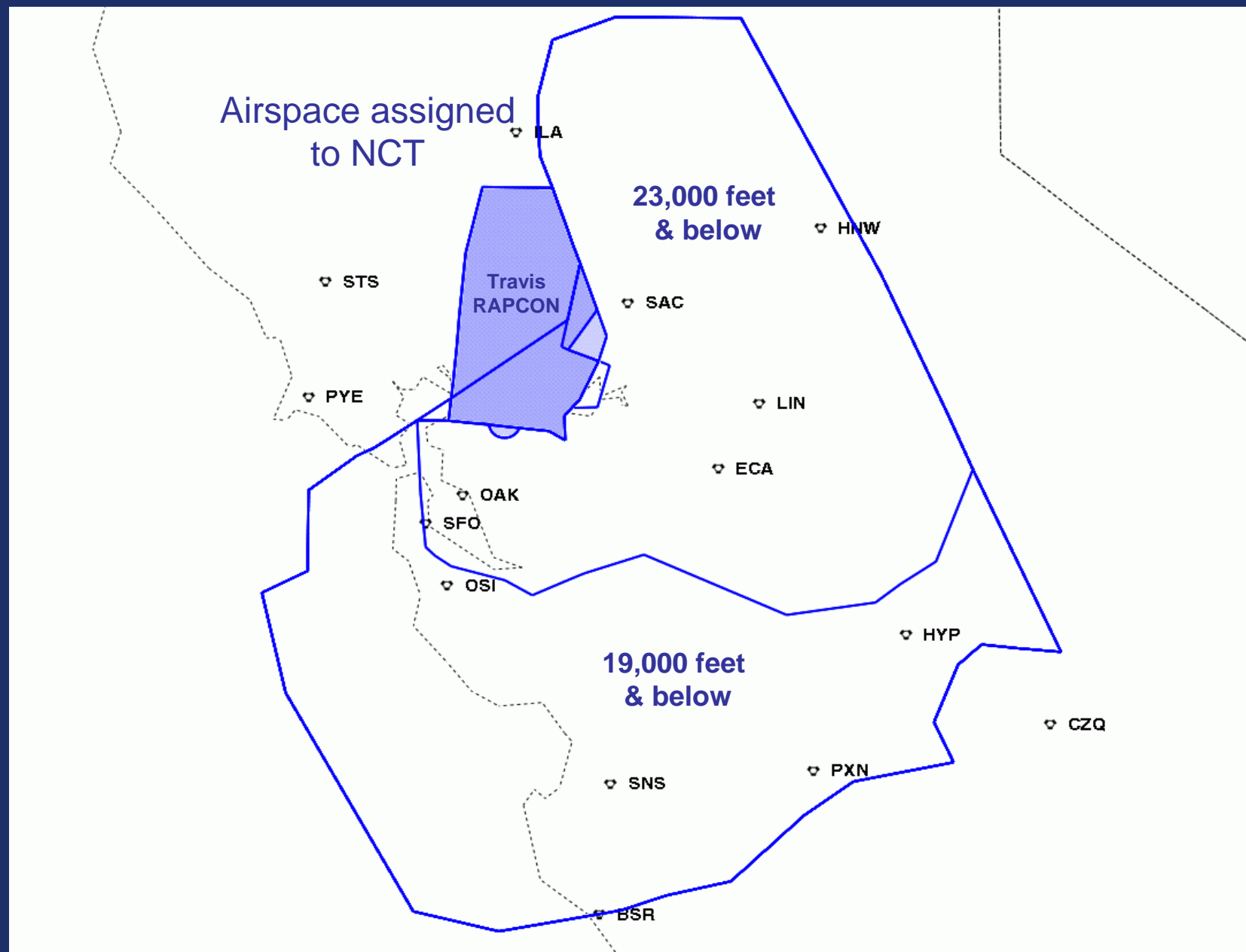
TRACONs

- Most “stand-alone” TRACONs are located on airports (e.g. DFW TRACON), but not all.
- Consolidated TRACONs – cover a larger area than stand-alone TRACONs:
 - Northern California TRACON
 - Southern California TRACON
 - New York TRACON (NYC and Northern NJ airports)
 - Potomac TRACON (Washington DC area airports)

Airspace

- Terminal radar airspace is typically delegated via a letter of agreement (LOA) between the TRACON and the parent ARTCC.
- Airspace is designed to provide efficient traffic flows to and from the primary airports located in the airspace.





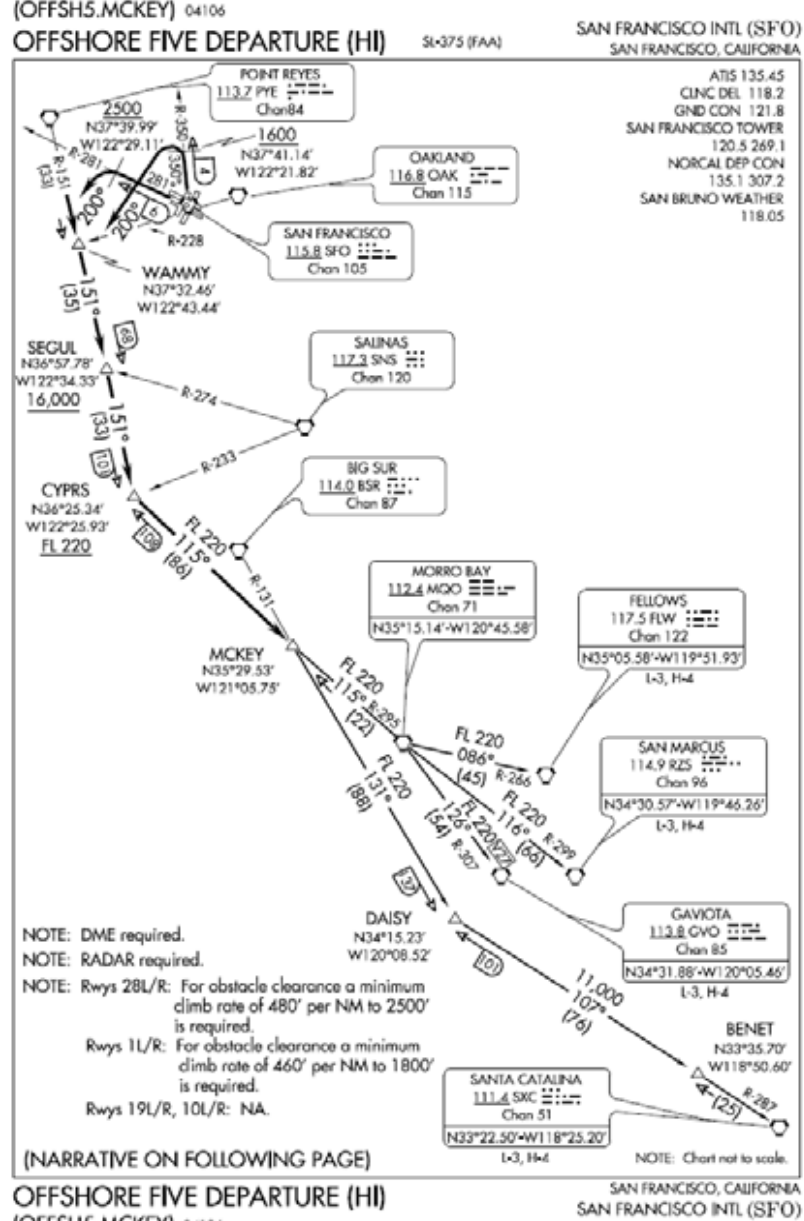
Departure Procedures (DP):

- Most departures in a busy environment will be assigned a DP.
- DP's provide for obstacle and terrain clearance (a climb of 200 feet per NM is assumed).
- DP's can be textual or graphical.

SACRAMENTO MATHER

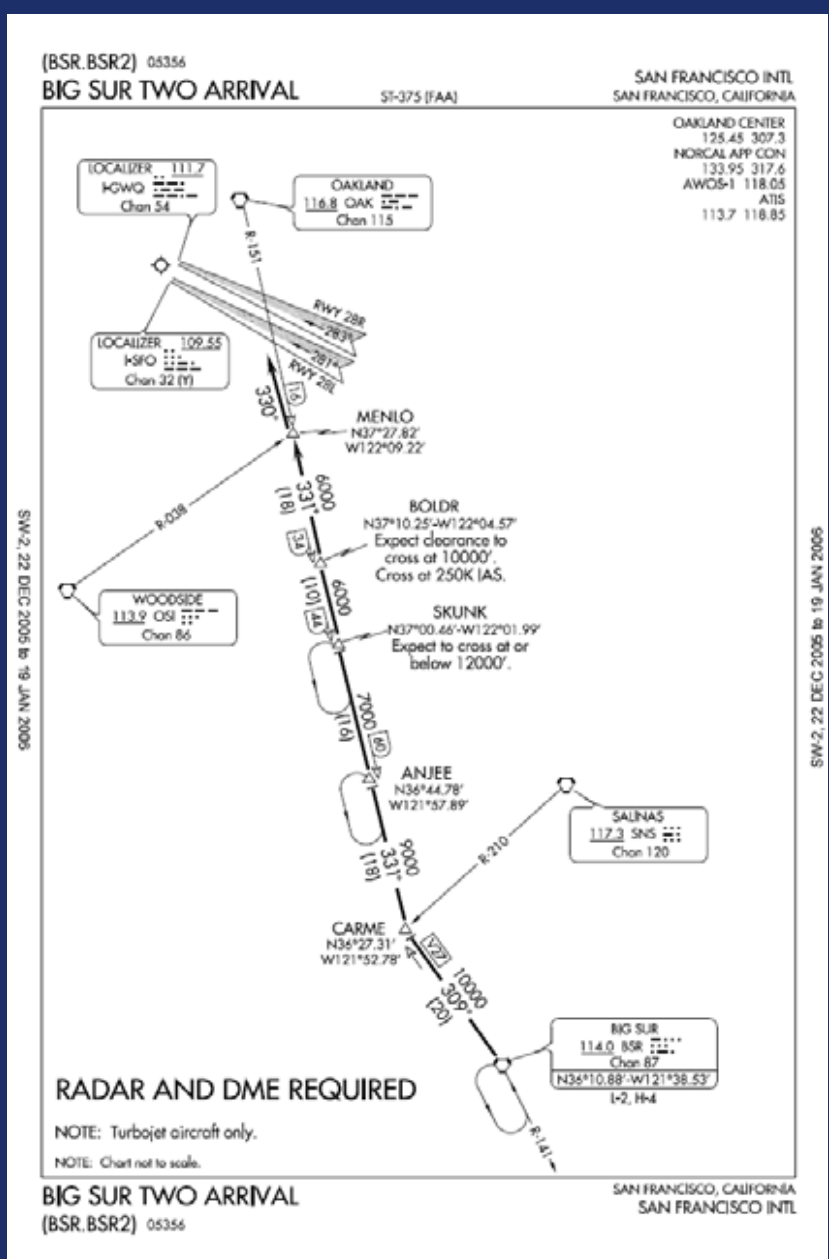
DEPARTURE PROCEDURE: **Rwys 4L,4R**, climbing right turn direct SAC VORTAC. **Rwys 22 L,22R** climb direct SAC VORTAC.

- A SID is a DP built for ATC needs.
- SID's provide for obstacle and terrain clearance (a climb of 200 feet per NM is assumed).
- SID's are graphical.



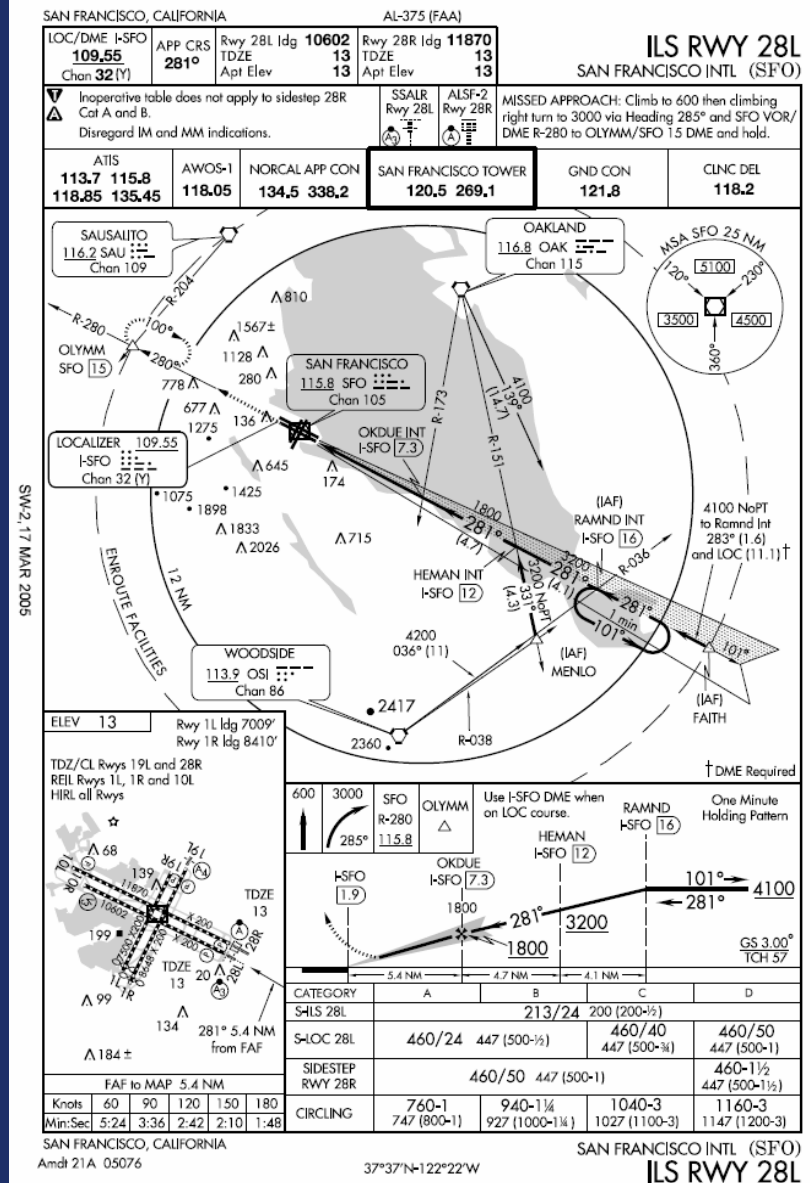
Standard Terminal Arrival Procedures (STAR):

- Most arrivals in a busy environment will be assigned a STAR.
- STAR's assist in delivering aircraft from the en-route environment to an instrument approach procedure.



Instrument Approach Procedures (IAP):

- IAP's are the guidance from the en-route environment to the airport.
- IAP's have different weather minimums based on speed of aircraft (or by company policy).



NCT TRACON Control Room



FAA Radar Systems

The FAA operates two basic radar systems:

- Airport Surveillance Radar (ASR);
- Air-Route Surveillance Radar (ARSR).

Both of these surveillance systems use primary (raw radar) and secondary (beacon) radar returns to give controllers aircraft position and speed information, plus altitude information from Mode C transponder equipped aircraft. Most ASR's provide 4.8 second sweeps (updates) and while ARSR's provide 12 second sweeps.

Specialized Surveillance Systems

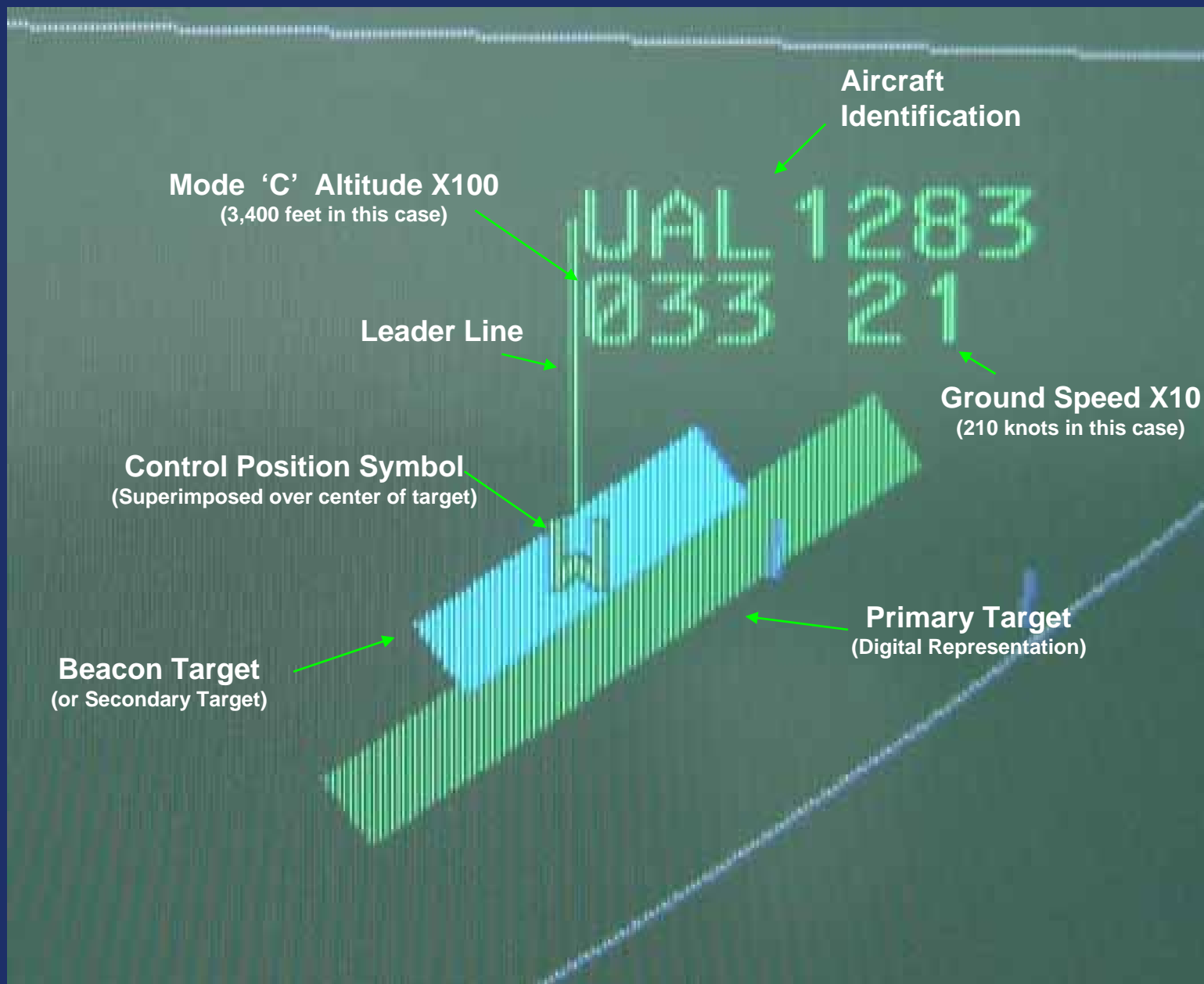
- Precision Runway Monitor (PRM) is a high-update-rate surveillance radar system for capacity-constrained airports. Certified to provide simultaneous independent approaches to closely spaced parallel runways, PRM enables ATC to improve the arrival rate when weather conditions require instrument approaches.
- The Precision Approach Radar (PAR) is designed to be used as a landing aid rather than an aid for sequencing and spacing aircraft. PAR equipment may be used as a primary landing aid or it may be used to monitor other types of approaches. It provides range, azimuth, and elevation information. In the U.S. PAR is used mostly by the military.

Terminal Automation Systems

- A generic term for the computer system that tracks and provides a alpha-numeric label for select radar returns
- TAS facilitates intra- and inter-facility transfers and the coordination of flight information.
- Most TAS's have the capability of communicating with other TAS's as well as with the ARTCC.

Terminal Automation Systems (cont'd)

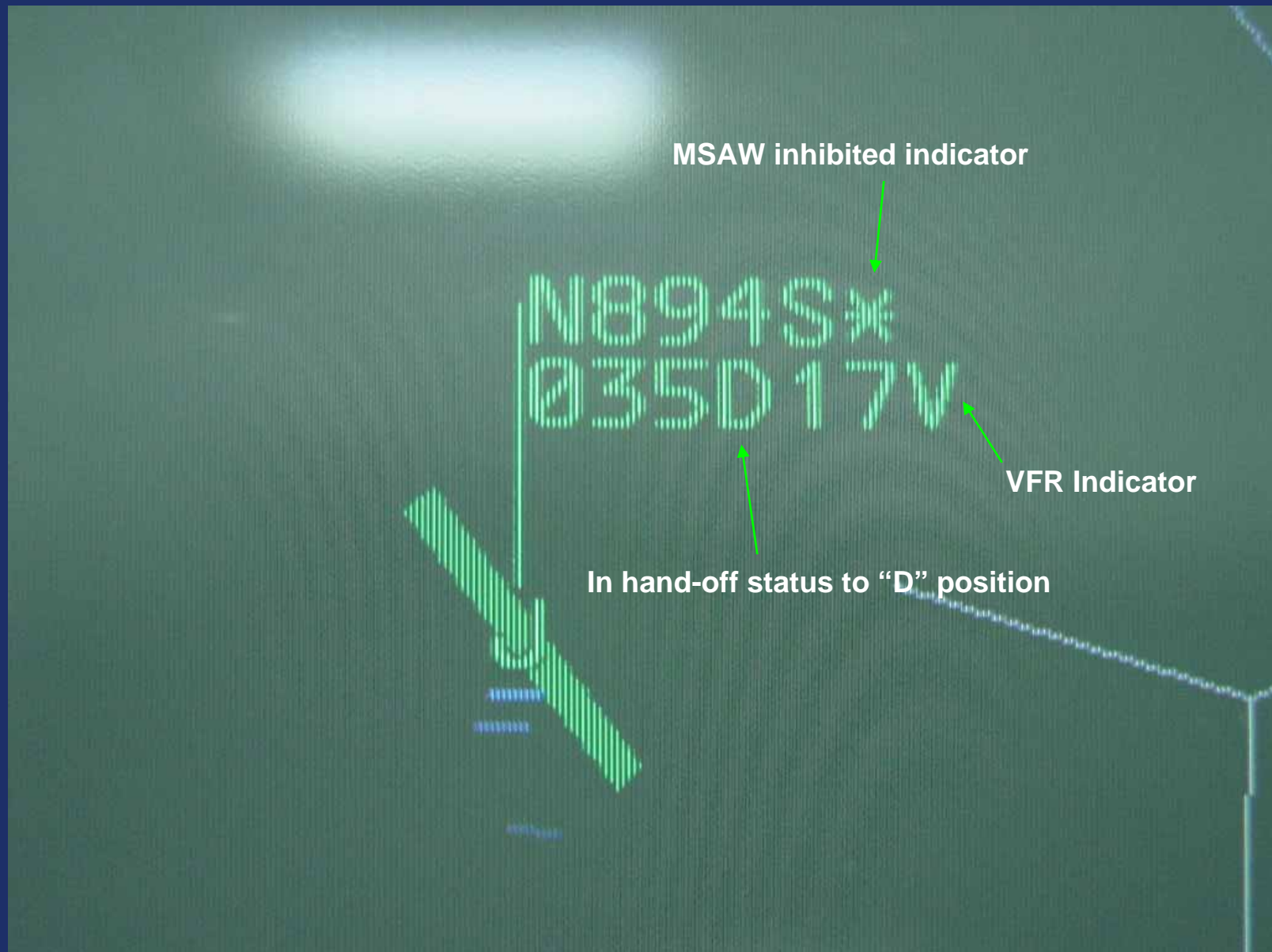
- Most common TAS is called ARTS
(Automated Radar Tracking System)
- Replacement systems include Common ARTS
and STARS
(Standard Terminal Automated Replacement System)



3 Character Scratch-Pad
("Time-shares" with
altitude readout)

UAL 1283
SFO ✕ B733

Aircraft Type
("Time-shares" with
ground speed readout)



Radar Identification Methods

- **Primary:**
 - Observing a departing aircraft target within 1 mile of the takeoff runway end at airports with an operating control tower.
 - Observing a target whose position with respect to a fix (displayed on the video map, scribed on the map overlay, or displayed as a permanent echo) or a visual reporting point.
 - Observing a target make an identifying turn or turns of 30 degrees or more.

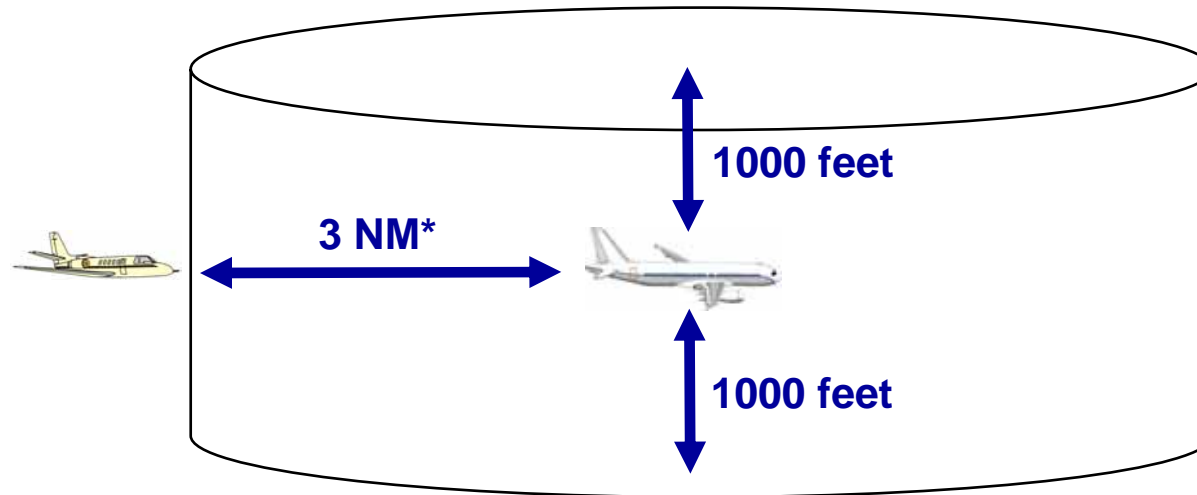
Radar Identification Methods

Using Automation:

- Request the aircraft to activate the "IDENT" feature of the transponder and then observe the identification display.
- Request the aircraft to change to a specific discrete or non-discrete code, as appropriate, and then observe the target or code display change.
- Request the aircraft to change transponder to "standby." After you observe the target disappear for sufficient scans to assure that loss of target resulted from placing the transponder in "standby" position, request the aircraft to return transponder to normal operation and then observe the reappearance of the target.

Terminal Radar Separation

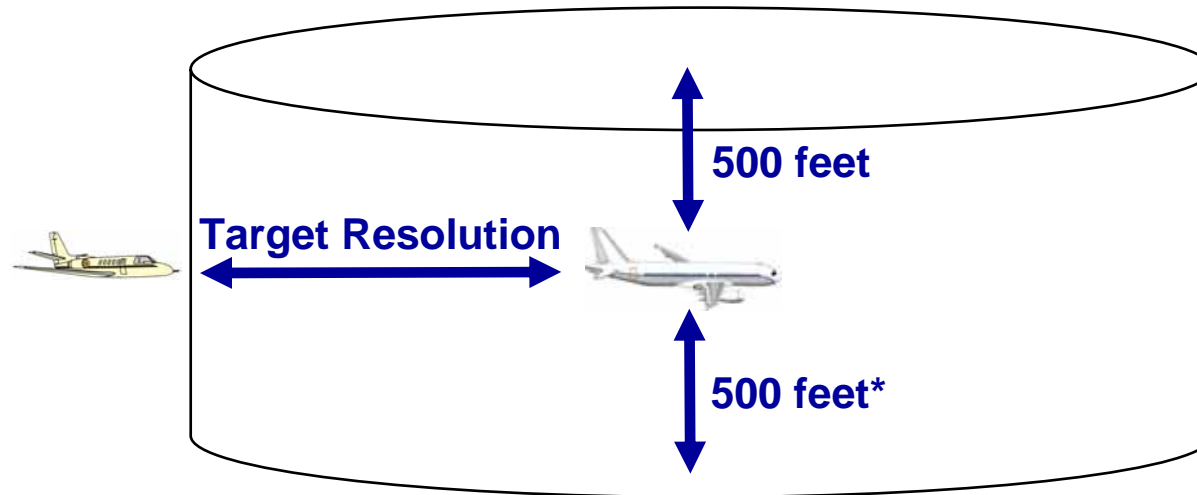
- IFR vs IFR regardless of airspace



* 5NM when operating behind a “heavy jet” (B747, B767, B777, MD11, A380 for examples), 40NM or more from the radar antenna, or when using multiple (mosaic) radar data sources.

Terminal Radar Separation

- IFR vs VFR in Class B/C airspace



*1,000 when operating below a "heavy jet"
(For example: B747, B767, B777, MD11, A380).

TRACON ATC Position



ARTS Keyboard & Trackball



Controller Information Display (ACE-IDS)



Terminal Training

- **FAA Academy (Oklahoma City) - 12 weeks**
 - Fundamentals of aviation and ATC
 - Classroom and simulation labs
- **Field Facility**
 - Classroom (local airspace and procedures):
4 to 12 weeks depending on facility
 - OJT:
6 to 30 months to facility certification